

## REMARKS

Applicant respectfully requests reconsideration of this application in view of the following remarks. For the Examiner's convenience and reference, Applicant's remarks are presented in substantially the same order in which the corresponding issues were raised in the Office Action. Please note that the following remarks are not intended to be an exhaustive enumeration of the distinctions between any cited references and the claimed invention. Rather, the distinctions identified and discussed below are presented solely by way of example to illustrate some of the differences between the claimed invention and the cited references. In addition, Applicant requests that the Examiner carefully review any references discussed below to ensure that Applicant's understanding and discussion of the references, if any, is consistent with the Examiner's understanding.

### Status of the Claims

Claims 1-3 and 5-21 are pending. Claims 1, 3, 5, 6, 8, 12, and 21 are currently amended to more clearly define preexisting limitations. No claims are canceled. No claims are added. No new matter has been added.

### Summary of the Office Action

Claim 3 stands objected to because of informalities.

Claims 19-21 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as his invention.

Claims 1-3, 5-14, and 17-18 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,510,497 to Strongin et al. (hereinafter "Strongin")

Claims 15-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Strongin.

### Response to Objections

Claim 3 stands objected to because of informalities. In particular, the Office Action states that the phrase "dynamically configurable adjustable by software" is awkward and unclear. Applicant respectfully submits that claim 3 has been amended to

read “dynamically configurable by software” so it is not awkward or unclear. Applicant respectfully requests that the objection to claim 3 be withdrawn.

Response to Rejections under 35 U.S.C. § 112, second paragraph

The Office Action rejected claims 19-21 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant respectfully request withdrawal of these rejections because the language of these claims is definite within the context of the specification and application as a whole.

**CLAIMS 19-20**

Claims 19 and 20 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. In particular, the Office Action states that it is unclear which element performs the functions of “filter logic” and “combining.” Applicant respectfully submits that the language of the claims demonstrates a relationship between the purportedly unclear phrases because each claim recites “filter logic configured to combine.” Therefore, there should be no confusion or indefiniteness as to the filter logic configured to combine thread quality of service scheduling and volatile memory scheduling.

Applicant further reiterates the language of the specification, which states that outputs of the quality of service scheduler 340 and the DRAM scheduler 345 are combined 360, as shown in Figure 3, and that the filter representation of Figure 7 shows one method for combining the different scheduling components. Therefore, the language of claims 19 and 20 is definite in light of the specification.

Given that the language of claims 19 and 20 is clearly defined in each claim and in the overall context of the application, the language of claims 19 and 20 is definite. Accordingly, Applicant respectfully requests that the rejection of claims 19 and 20 under 35 U.S.C. § 112, second paragraph, be withdrawn.

**CLAIM 21**

Claim 21 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. In particular, the Office Action states that the scope of the claim cannot be

determined because the claim recites “means for tracking a current state of the device” and “tracking” language is found in several areas of the specification. Applicant agrees with the Examiner that “tracking” language is found in various locations of the specification. However, the Office Action’s assertion that claim 21 is indefinite because the words “track” and “tracking” are used several times within the specification is misguided. A claim that uses a word is not indefinite merely because that word may be used several times within the specification. The definiteness of a claim, as a whole, is independent of how many times a word might be used in the specification, as long as the language of the claim, as a whole, clearly points out what Applicant intends to claim. Although the Office Action has noted several occurrences of “tracking” language in the specification, the Office Action fails to recognize that the language of claim 21 is definite because the claim specifically recites “means for tracking a current state of the device.” Applicant is not required to point out the corresponding structure for such means. Nevertheless, the specification provides at least one example of such means in the form of the scheduler 505 of Figure 5. Therefore, the Office Action fails to establish how the language of the claim, as a whole, is purportedly indefinite.

Given that the language of claim 21 is clearly defined in the claim, as a whole, and in the overall context of the application, the language of claim 21 is definite. Accordingly, Applicant respectfully requests that the rejection of claim 21 under 35 U.S.C. § 112, second paragraph, be withdrawn.

#### Response to Rejections under 35 U.S.C. § 102(e)

The Office Action rejected claims 1-3, 5-14, and 17-18 under 35 U.S.C. § 102(e) as being anticipated by Strongin. Applicant respectfully requests withdrawal of these rejections because the cited reference fails to disclose all of the limitations of the claims.

#### **CLAIMS 1-3 AND 5**

Claim 1 stands rejected under 35 U.S.C. § 102(e) as being anticipated by Strongin. Applicant respectfully submits that claim 1 is patentable over the cited reference because Strongin does not disclose all of the limitations of the claim. Claim 1, as amended, recites:

A method for scheduling access to a device comprising:  
tracking a current state of a device;  
**tracking a count of a number of scheduled requests which require the current state; and**  
**switching the state of the device after determining the count reaches a threshold value** established for a switch point and receiving one or more incoming requests which require an alternate state to the current state of the device.  
(Emphasis added).

In support of the rejection, the Office Action states, in part:

**Tracking a count of a number of requests which require a "particular" state** is disclosed in column 11, lines 55-60, as the number of requests issued and/or amount of time elapsed. Both "particular states" would inherently require a count of some sort. A count is one or more, and the particular state is the bus direction, as is further explained in column 18, lines 22-35.

Scheduling requests to a device using the current state of the device, the count of the number of requests that have already been scheduled using the current state, a threshold value established for a switch point (number of pending operations) indicating when to switch state, wherein after the count reaches the switch point and there are incoming requests having an alternate state to the current state (a different bus direction or a different open bank of DRAM) of the device, **switching the state of the device** to process incoming requests is disclosed in column 12, lines 20-35. Also see column 18, lines 22-35, which discusses scheduling a number of "tracked" requests based on the bus direction, or "device state." The "switch point" is when the pending requests consistent with the memory bus direction are issued, and the bus direction reverses, or switches, to allow the scheduled requests that were previously inconsistent with the previous bus direction to now issue. However many requests there are, in a certain bus direction (read or write), in the queue, is the threshold.

Office Action, August 11, 2005, pp. 4-5 (emphasis added).

Applicant respectfully disagrees with the Office Action's characterization of the prior art because Strongin fails to disclose all of the limitations of the claim. In particular, Strongin does not disclose tracking a count of a number of scheduled requests and switching the state of the device after determining the count reaches a threshold value.

Strongin is directed to a memory controller to schedule accesses to system memory. Strongin, Abstract. Strongin teaches that the memory controller, via the memory arbiter and memory state tracking unit, receives information about the status of

the system memory. Strongin, col. 11, lines 43-52. In some embodiments, the memory state tracking unit receives information such as open pages, access positions, and bus direction via a physical control line. Id. In alternative embodiments, the memory state tracking unit determines memory state indirectly based on previous memory access activity. Strongin, col. 11, lines 58-59. Exemplary previous memory access activity includes information about previous memory requests issued and/or elapsed time since requests. Strongin, col. 11, lines 59-61. The memory arbiter then uses this memory state information to schedule pending memory operations according to a scheduling hierarchy. Strongin, col. 12, lines 3-12. The scheduling hierarchy includes six hierarchical levels that depend on one or more of the following memory operation characteristics: whether the operation is speculative or non-speculative, whether the requested page is open or not open, and whether the required bus direction is the same as or different from the current bus direction. Strongin, col. 12, lines 11-44.

With regard to tracking a count, Strongin fails to disclose tracking a count of a number of scheduled requests. The Office Action's assertion that such tracking is disclosed in Strongin mischaracterizes the cited reference. Specifically, Strongin teaches using information from previous memory access activity to determine the status of the system memory. The descriptions of previous memory requests issued and elapsed time do not disclose the tracking limitation of the claim because neither description discloses tracking a count of a number of scheduled requests. The reference to previous memory requests is silent with regard to how many requests may have been issued, scheduled, or processed. The Office Action correctly recognizes that Strongin does not explicitly disclose a count of any sort.

Rather, the Office Action asserts that tracking a count is inherently disclosed as the number of requests issued or the time elapsed. To be sure, the passing of time involves counting units of time (e.g., seconds, minutes, etc.), but the disclosure of elapsed time is irrelevant here because the claim recites tracking a count of a number of scheduled requests, not tracking time units. With regard to the previous memory requests issued, the Office Action fails to provide extrinsic evidence to show how the reference to the previous memory requests issued inherently discloses tracking a count of a number of scheduled requests. To assert that a limitation of a claim is inherently disclosed by a

reference, extrinsic evidence supporting the assertion must be provided. M.P.E.P. § 2131.01(III). The only support offered in the Office Action is a statement that the state of the system memory would require a count of some sort and a count is one or more. To say that a state of the device would require a count is meaningless because the state of the system memory refers to the open pages, access positions, bus direction, and so forth, none of which necessarily require a count of a number of scheduled requests. Moreover, the phrase “one or more” simply refers to the presence of one or more units. It does not necessarily require that the specific number of units be counted, only that it is known if there is at least one unit. Therefore, the burden of proof is not satisfied because the Office Action’s reasoning and lack of extrinsic evidence are insufficient to establish a *prima facie* case of inherency regarding the claim limitation of tracking a count of a number of scheduled requests.

With regard to switching states, Strongin fails to disclose switching the state of the device after determining the count reaches a threshold value. Strongin explicitly teaches scheduling memory operations according to the disclosed hierarchy, which specifies that device states remain the same until all of the operations of a specific type are processed. For example, the speculative memory operations are not scheduled until all of the non-speculative memory operations have been scheduled. Strongin does not disclose changing the device states after scheduling a certain number of memory operations. Rather, the hierarchical scheduling scheme of Strongin is completely independent of how many operations of a particular type are scheduled. Strongin merely teaches scheduling all operations of one type before scheduling any operations of another type. Therefore, Strongin fails to disclose switching the state of the device after determining the count reaches a threshold value.

In contrast, claim 1 recites “tracking a count of a number of scheduled requests” and “switching the state of the device after determining the count reaches a threshold value.” For the reasons stated above, Strongin fails to disclose all of the limitations of claim 1. In particular, Strongin does not disclose tracking a count of a number of scheduled requests and switching the state of the device after determining the count reaches a threshold value. Given that the cited reference fails to disclose all of the limitations of the claim, Applicant respectfully submits that claim 1 is patentable over the

cited reference. Accordingly, Applicant requests that the rejection of claim 1 under 35 U.S.C. § 102(e) be withdrawn.

Given that claims 2, 3, and 5 depend from independent claim 1, which is patentable over the cited reference, Applicant respectfully submits that dependent claims 2, 3, and 5 are also patentable over the cited reference. Accordingly, Applicant requests that the rejection of claims 2, 3, and 5 under 35 U.S.C. § 102(e) be withdrawn.

## CLAIMS 6, 7, 12, 16, 18, AND 20

Claim 6 stands rejected under 35 U.S.C. § 102(e) as being anticipated by Strongin. Applicant respectfully submits that claim 6 is patentable over the cited reference because Strongin does not disclose all of the limitations of the claim. Claim 6, as amended, recites:

A bus scheduler comprising:

an input configured to receive at least one incoming request, each request indicating a bus direction;

a switch point;

an indicator of a current bus direction;

a unit to **track a count of requests processed** using the current bus direction; and

logic configured to **switch the direction of the bus to process incoming requests after the count reaches a threshold value** established for the switch point and there are incoming requests having the direction opposite to the current direction of the device bus.

(Emphasis added).

In support of the rejection, the Office Action states, in part:

**A count of requests processed** through the current bus direction is disclosed in column 18, lines 22-35 as the "one or more" pending access requests. "One or more" indicates a number, which is a count.

Logic configured to **switch the direction of the bus** to process incoming requests wherein after the count reaches the switch point and there are incoming requests having the direction opposite to the current direction of the device bus, switching the direction of the device bus is disclosed in column 18, lines 22-35, which discloses issuing the requests consistent with a bus direction ahead of, or before, the requests inconsistent with the bus direction. (The logic for implementing this method is disclosed in column 17 and 18 in claims 1-12, for example).

Office Action, August 11, 2005, pp. 6-7 (emphasis added).

Applicant respectfully disagrees with the Office Action's characterization of the prior art because Strongin fails to disclose all of the limitations of the claim. In

particular, Strongin does not disclose track a count of requests processed and switch the direction of the bus to process incoming requests after the count reaches a threshold value.

Strongin is directed to a memory controller to schedule accesses to system memory. Strongin, Abstract. Strongin teaches that the memory controller, via the memory arbiter and memory state tracking unit, receives information about the status of the system memory. Strongin, col. 11, lines 43-52. The memory arbiter then uses this memory state information, including information about previous memory requests issued and/or elapsed time since requests, to schedule pending memory operations according to a scheduling hierarchy. Strongin, col. 11, line 59 to col 12, line 44.

With regard to tracking a count, Strongin fails to disclose tracking a count of requests processed. The description of elapsed time since requests is irrelevant here because the claim recites tracking a count of requests processed, not tracking time units. The burden of proof required to show how the description of previous memory requests issued inherently discloses tracking a count is not satisfied because the Office Action fails to provide extrinsic evidence and the Office Action's reasoning mischaracterizes the disclosure with respect to the state of the device and the general meaning of the phrase "one or more." Therefore, the Office Action fails to establish a *prima facie* case of inherency regarding the claim limitation of tracking a count of requests processed.

With regard to switching bus directions, Strongin fails to disclose logic configured to switch the direction of the bus to process incoming requests after the count reaches a threshold value. Strongin merely teaches scheduling memory operations according to the disclosed hierarchy, which is independent of how many operations of a particular type are issued, scheduled, or processed. Strongin does not disclose changing the device states after scheduling or processing a certain number of memory operations. Therefore, Strongin fails to disclose logic configured to switch the direction of the bus to process incoming requests after the count reaches a threshold value.

In contrast, claim 6 recites "track a count of requests processed" and "switch the direction of the bus to process incoming requests after the count reaches a threshold value." For the reasons stated above, Strongin fails to disclose all of the limitations of claim 6. In particular, Strongin does not disclose track a count of requests processed and

switch the direction of the bus to process incoming requests after the count reaches a threshold value. Given that the cited reference fails to disclose all of the limitations of the claim, Applicant respectfully submits that claim 6 is patentable over the cited reference. Accordingly, Applicant requests that the rejection of claim 6 under 35 U.S.C. § 102(e) be withdrawn.

Given that claims 7, 12, 16, 18, and 20 depend from independent claim 6, which is patentable over the cited reference, Applicant respectfully submits that dependent claims 7, 12, 16, 18, and 20 are also patentable over the cited reference. Accordingly, Applicant requests that the rejection of claims 7, 12, and 18 under 35 U.S.C. § 102(e) and the rejection of claim 16 under 35 U.S.C. § 103(a) be withdrawn.

#### CLAIMS 8-11, 13-15, 17, AND 19

Claim 8 stands rejected under 35 U.S.C. § 102(e) as being anticipated by Strongin. Applicant respectfully submits that claim 8 is patentable over the cited reference because Strongin does not disclose all of the limitations of the claim. Claim 8, as amended, recites:

A scheduler comprising:  
    a switch point;  
    a first unit to track a current state of a device;  
    a second unit to **track a count of requests that require a particular state;**  
        logic configured to **facilitate an updated device state when the count crosses a threshold** of the switch point; and  
        scheduling logic configured to schedule access requests to the device using the updated device state.  
(Emphasis added).

In support of the rejection, the Office Action states, in part:

**A count is disclosed as "one or more" in column 18, line 30.**  
**Logic configured to determine an updated device state** using the switch point and count such that when the count crosses a threshold of the switch point, the device state is changed is disclosed in column 18, lines 22-35, where memory accesses are scheduled based on the bus direction and the page status.

Office Action, August 11, 2005, p. 7 (emphasis added).

Applicant respectfully disagrees with the Office Action's characterization of the prior art because Strongin fails to disclose all of the limitations of the claim. In

particular, Strongin does not disclose a second unit to track a count of requests that require a particular state and logic configured to facilitate an updated device state when the count crosses a threshold.

Strongin is directed to a memory controller to schedule accesses to system memory. Strongin, Abstract. Strongin teaches that the memory controller, via the memory arbiter and memory state tracking unit, receives information about the status of the system memory. Strongin, col. 11, lines 43-52. The memory arbiter then uses this memory state information, including information about previous memory requests issued and/or elapsed time since requests, to schedule pending memory operations according to a scheduling hierarchy. Strongin, col. 11, line 59 to col 12, line 44.

With regard to tracking a count, Strongin fails to disclose tracking a count of requests that require a particular state. The description of elapsed time since requests is irrelevant here because the claim recites tracking a count of requests that require a particular state, not tracking time units. The burden of proof required to show how the description of previous memory requests issued inherently discloses tracking a count is not satisfied because the Office Action fails to provide extrinsic evidence and the Office Action's reasoning mischaracterizes the disclosure with respect to the state of the device and the general meaning of the phrase "one or more." Therefore, the Office Action fails to establish a *prima facie* case of inherency regarding the claim limitation of tracking a count of requests that require a particular state.

With regard to updating a device state, Strongin fails to disclose logic configured to facilitate an updated device state when the count crosses a threshold. Strongin merely teaches scheduling memory operations according to the disclosed hierarchy, which is independent of how many operations of a particular type are issued, scheduled, or processed. Strongin does not disclose changing the device states after scheduling or processing a certain number of memory operations. Therefore, Strongin fails to disclose logic configured to facilitate an updated device state when the count crosses a threshold.

In contrast, claim 8 recites "track a count of requests that require a particular state" and "facilitate an updated device state when the count crosses a threshold." For the reasons stated above, Strongin fails to disclose all of the limitations of claim 8. In particular, Strongin does not disclose a second unit to track a count of requests that

require a particular state and logic configured to facilitate an updated device state when the count crosses a threshold. Given that the cited reference fails to disclose all of the limitations of the claim, Applicant respectfully submits that claim 8 is patentable over the cited reference. Accordingly, Applicant requests that the rejection of claim 8 under 35 U.S.C. § 102(e) be withdrawn.

Given that claims 9-11, 13-15, 17, and 19 depend from independent claim 8, which is patentable over the cited reference, Applicant respectfully submits that dependent claims 9-11, 13-15, 17, and 19 are also patentable over the cited reference. Accordingly, Applicant requests that the rejection of claims 9, 11, 13, 14, and 17 under 35 U.S.C. § 102(e) and the rejection of claim 15 under 35 U.S.C. § 103(a) be withdrawn.

Response to Rejections under 35 U.S.C. § 103(a)

The Examiner rejected claims 15-16 under 35 U.S.C. § 103(a) as being unpatentable over Strongin. Given that claim 15 depends from independent claim 8, which is patentable over the cited reference, Applicant respectfully submits that dependent claim 15 is also patentable over the cited reference. Given that claim 16 depends from independent claim 6, which is patentable over the cited reference, Applicant respectfully submits that dependent claim 16 is also patentable over the cited reference. Accordingly, Applicant requests that the rejection of claims 15-16 under 35 U.S.C. § 103(a) be withdrawn.

## CONCLUSION

It is respectfully submitted that in view of the amendments and remarks set forth herein, the rejections and objections have been overcome. If the Examiner believes a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Jeffrey Holman at (408) 720-8300.

If there are any additional charges, please charge them to Deposit Account No. 02-2666.

Respectfully submitted,

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